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EXAMINER

TRAN, BINH X

ART UNIT

PAPER NUMBER

1765

DATE MAILED: 09/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|--------------------------------------|------------------------------------|--|
| Office Action Summary | Application No. 10/696,771 | Applicant(s) GUHA ET AL. | |
| | Examiner Binh X. Tran | Art Unit 1765 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 July 2006.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 1 and 3-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 3-4, 6, 8-9 are rejected under 35 U.S.C. 102(e) as being anticipated by Jacobson et al. (US 2004/0033679 A1).

Respect to claim 1, Jacobson discloses a method for chemical fabricating or altering a sub-micro-structure on an object, comprising:

providing a heating means (light source) proximate to a local region of the object wherein said heating means includes a heat emitting surface (See Fig 6-8, Fig 14 paragraph 0074-0077);

providing at least one reactant (hydrocarbon vapor 630) on the local region of the object;

selectively heating the local region using the heating means to facilitate in the local region a local chemical reaction for forming or altering a sub-microstructure on the local region (i.e. forming feature 670 or 730 or 830; See paragraph 0073-0075).

Respect to claims 3, Jacobson discloses the local region is provided with a gaseous phase reactants (i.e. hydrocarbon vapor 630). Respect to claim 4, Jacobson discloses the chemical reactions effects at least one of depositing process to form local features (i.e. feature 670, 730 or 830). Respect to claim 6, Jacobson discloses the heater is electron beam or focused ion beam (FIB) (read on nanoheater or thermal transducer, See paragraph 0077). Respect to claims 8-9, Jacobson teaches the heat-conductive medium is a reactant (paragraph 0077)

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1, 4, 6, 8-9, 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yu (US 6,291,302) in view of Albrecht et al. (US 5,537,372).

Respect to claim 1, Yu discloses a method for chemical fabricating or altering a sub-micro-structure on an object, comprising:

providing a heating means (laser) proximate to a local region of the object;

providing at least one reactant (i.e. dopant) to a local region of the object.

selectively heating the local region using the heating means to facilitate in the local region a local chemical reaction for forming or altering a submicrostructure on the local region (i.e. activating the dopant in the source/drain region; See col.4 -5).

Yu does not explicitly disclose that the heating means includes a heat emitting surface. However, Yu clearly discloses using laser as a heating means (col. 5 lines 5-20). Albrecht discloses using diode laser (56) having a heat emitting surface (the surface of the laser diode 56) (See Fig 7). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Yu in view of Albrecht by using a heating means having a heat emitting surface because the laser diode is well known in the art. Further, laser must emit from the laser source (such as a laser diode). A laser diode certainly must have a heat emit surface because it emit the laser light beam.

Respect to claim 4, Jacobson discloses the chemical reactions effects at least one of depositing process to form local features (implanting or activating dopants in source/drain region; See col. 5 lines 5-23). Respect to claim 6, Yu discloses the heater is a laser beam (read on nanoheater or thermal transducer, See col. 5). Respect to claims 8-9, Yu teaches the heat-conductive medium is a reactant (dopant and/or source/drain material) (See col. 4-5). Respect to claims 12-14, Yu discloses that submicrostructure is a portion of an integrated circuit (IC) including a gate stack (16)

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(read on "a line" limitation in claim 13), or a field effect transistor (abstract). Respect to claim 15, Yu discloses the chemical reaction is at least one of the reactions forming source and drains regions or gate stack (col. 4 lines 20-26, col. 5 lines 5-23).

6. Claims 5, 7, 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jacobson in view of Albrecht et al. (US 5,537,372).

Respect to claim 5, Jacobson fails to disclose the heating means is adapted to a first end of a cantilever, wherein said cantilever has a second end coupled to a device for positioning the heating means. However, Jacobson clearly teaches to use laser beams from a light source along with the mirror in order to local heat a selected area. (paragraph 0084, 0087). Albrecht teaches to use laser beam along with stylus (52) adapted to a first end cantilever arm (50), wherein the cantilever has a second end coupled to a device (i.e. contact sensor 48) for positioning the heating means (Fig 7, col. 7 lines 30-67). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Jacobson in view of Albrecht by using a heating means adapted to a cantilever because it easier to control the location of heating area.

Respect to claim 7, Jacobson fails to teach the heat-emitting surface of the thermal transducer has topographic dimensions in a range of about 10-200 nm. Albrecht teaches to use a tip size having a dimension of 100 angstroms (100 angstrom = 10 nm; See col. 6 lines 26-30, Fig 1). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Jacobson in view of Albrecht by having the dimension as discussed above because it will increase the density data for the storage medium.

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Respect to claim 16, Albrecht disclose the submicrostructure is an high density data storage system such as information-containing portion of a recording medium (abstract). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Jacobson in view of Albrecht by using optical recording medium because this will allow for a high density data storage system.

7. Claims 5, 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jacobson in view of Binnig et al. (US 6,218,086).

Respect to claim 5, Jacobson fails to disclose the heating means is adapted to a first end of a cantilever, wherein said cantilever has a second end coupled to a device for positioning the heating means. However, Jacobson clearly teaches to use laser beams from a light source along with the mirror in order to local heat a selected area. (paragraph 0084, 0087). Binnig teaches that heating means is adapted to a first end of the cantilever (2), wherein the cantilever has a second end coupled to a device for position the heating means (col. 4 lines 1-15). Binnig further discloses using the tip to heat a local area having additional advantage of a very low energy consumption and very small power dissipation (col. 6 lines 48-58). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Jacobson in view of Binnig by using a heating means adapted to a cantilever because it results in low energy consumption.

Respect to claim 10, Binnig discloses the sub-micro-structures is a feature of a lithographic reticle or a mask (i.e. resist mask) formed on the substrate (5) (See Fig 5a-5c, col. 6, read on applicant's limitation "defect eliminating feature"). Respect to claim

11, Binnig discloses etching a film in an opaque region (See Fig 5a-5c, col. 6). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Jacobson in view of Binnig by using resist mask to etch an opaque region of the substrate because resist mask are well known in the semiconductor etching. Further, a resist mask is used to protect the underlying layer during the etching step in order to form a pattern on the substrate.

8. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jacobson and Albrecht as applied to claim 16 above, and further in view of Field (US 2003/0222965 A1).

Respect to claim 17, Jacobson and Albrecht fails to disclose the recording medium comprises at least one of digital video disks and compact recording disks. However, Albrecht clearly disclose the recording medium is an optical recording medium using laser beam. Field discloses an optical recording medium using laser beams includes DVD or CD (paragraph 002, 015). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Jacobson and Albrecht in view of Field by using DVD or CD because equivalent and substitution of one for the other would produce an expected result.

Response to Arguments

9. Applicant's arguments, see pages 5-6 of the remark, filed 7-7-2006, with respect to 1-2, 4-6, 8-9, 16 under the 35 USC 102 rejections as being anticipated by Durig have been fully considered and are persuasive. The examiner withdraws the previous 35 USC 102 rejections as being anticipated by Durig.

Applicant's arguments, see pages 7-8 of the remark, filed 7-7-2006, with respect to 1-2, 4-6, 8-11 under the 35 USC 102 rejections as being anticipated by Binnig have been fully considered and are persuasive. The examiner withdraws the previous 35 USC 102 rejections as being anticipated by Binnig.

Applicant's arguments, see pages 9-10 of the remark, filed 7-7-2006, with respect to 1-2, 4-6, 8-9, 12-15 under the 35 USC 102 rejections as being anticipated by Yu have been fully considered and are persuasive. The examiner withdraws the previous 35 USC 102 rejections as being anticipated by Yu.

Applicant's arguments, see pages 12-13 of the remark, filed 7-7-2006, with respect to 1-2, 4, 6, 8-9, 16-17 under the 35 USC 102 rejections as being anticipated by Field have been fully considered and are persuasive. The examiner withdraws the previous 35 USC 102 rejections as being anticipated by Field.

10. Applicant's arguments filed 7-7-2006 with respect to claims 1-4, 6, 8-9 under the 35 USC 102 rejections as being anticipated by Jacobson have been fully considered but they are not persuasive. The applicants argue that Jacobson fails to teach, "wherein said heating means includes a heat emitting surface". According to applicants, "Jacobson only teaches using beams of energy such as scanning beam or ion beam to charge hydrocarbons and nanoparticles". The examiner strongly disagrees. Jacobson clearly teaches to use beam of energy to heat the substrate. In Fig 6-8, Jacobson clearly discloses the energy beam is emitted from an energy emitter means. This energy emitter means clearly have a surface to emit the energy (heat) on the wafer surface (See Fig 6-8). Further in Figure 16, Jacobson clearly show that the beam of

energy (1650) is emitted from an energy source such as SEM (1610). This energy source (1610) (i.e. heating mean) clearly has a surface to emit energy (i.e. heat). Thus, the examiner still maintains the previous ground of rejection.

Since the applicant amended independent claim 1, the examiner reserves the right to provide a new ground of rejections as discussed above.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Binh X. Tran whose telephone number is (571) 272-1469. The examiner can normally be reached on Monday-Thursday and every other Friday. If attempts to reach the examiner by telephone are unsuccessful, the

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examiner's supervisor, Nadine Norton can be reached on (571) 272-1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Binh X. Tran

NADINE G. NORTON
SUPERVISOR

